

Effective wireless communications are critical to public safety agencies' ability to protect lives and property. The radio spectrum is a limited resource, especially in urban areas, and public safety agencies are unable to obtain sufficient radio spectrum to meet existing needs, much less to plan for future, more advanced communications requirements. The enormous growth in the use of mobile telecommunications and its demand for additional spectrum further limits the ability of public safety agencies to acquire spectrum.

The need for spectrum to support public safety agencies was thoroughly documented by the Public Safety Wireless Advisory Committee in 1996. Although some of the identified spectrum has been assigned for public safety use, it will not be available in most areas of the country until 2007. I urge you to make our leaders and policymakers aware that use of the new spectrum is needed immediately and also that additional spectrum is still required. I would also like to thank my colleagues on the PSWN Executive Committee who contributed to the development of this guide and endorsed its contents. Special thanks go to the members of the PSWN Program's Spectrum Integrated Program Team who dedicated time and effort to complete this guide.

Sincerely,



Mr. Steven Proctor
Executive Vice-Chair, PSWN Executive Committee, and
Executive Director, Utah Communications Agency Network

PUBLIC SAFETY

Radio Spectrum: A Vital
Resource for Saving Lives
and Protecting Property



About The PSWN Executive Committee

The PSWN Executive Committee is comprised of senior-level executives from local, state, and federal public safety agencies from across the country. Members have proven expertise or accomplishments in the field of law enforcement, fire and rescue, emergency medical services, public safety communications and information technology. The objectives of the committee are to raise awareness on the communications difficulties encountered by public safety personnel and to provide program guidance to the PSWN program as it works to achieve interoperable public safety communications.

Within minutes of the bombing of the Murrah Federal Building in Oklahoma City in 1995, firefighters, rescue workers, local and state police, and Emergency Medical Service crews were on scene. The American Red Cross, the FBI, Bureau of Alcohol, Tobacco, and Firearms, FEMA, and other disaster relief agencies very quickly joined the investigation and recovery effort. However, the lack of effective radio communications made this joint effort very difficult. Because their radio systems operated in different frequency bands, they were unable to communicate with each other. Runners had to be used to pass messages during the critical early stages of the incident.

In major disasters such as the Oklahoma City bombing, as well as more frequent day-to-day incidents—accidents, fires, police chases, or drug busts—public safety agencies require the use of the radio spectrum. Public safety personnel require effective radio communications not only to serve the public, but also to ensure their own personal safety.



FEMA News Photo

RADIO SPECTRUM

*refers to the array of channels available
for communications*

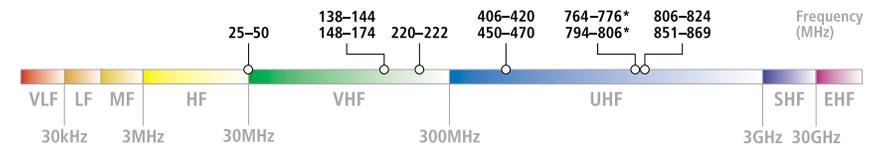
What is the Problem?

The amount of spectrum currently available for public safety agencies is insufficient to effectively carry out their critical missions. Most public safety agencies use spectrum to support voice communications. However, spectrum is increasingly being used to support more advanced technologies such as data, imagery, and video transmissions. In addition, current public safety radio channels are located in many areas of the spectrum. No single radio can tune to all channels within the public safety frequency bands. In many situations, these spectrum-related issues contribute to the public safety user's inability to achieve communications interoperability.

What Has Been Done?

Additional spectrum is being made available to public safety. Twenty-four Megahertz (MHz) of spectrum has been allocated recently, 764-776 MHz (TV channels 63 and 64) and 794-806 MHz (TV channels 68 and 69). This spectrum, which is currently used by television broadcasters, will not be available in most areas of the country until the broadcasters complete their transition to new channels for digital television (DTV) broadcasts.

Public Safety Spectrum Bands



The Federal Communications Commission (FCC) has established an aggressive DTV implementation schedule to facilitate the availability of the band for public safety use.

The FCC has also authorized federal agencies with public safety missions to have co-equal access to the new spectrum, implementation of which will facilitate shared systems development. Implementation of shared local, state, and federal communications systems will resolve many interoperability problems and will maximize the use of available funds. The newly allocated spectrum also includes 2.6 MHz set aside specifically for interoperable communications (voice, imaging, and data).

To advise on optimum use of the interoperability spectrum, the FCC established a Public Safety National Coordination Committee (NCC) to:

- (1) formulate an operational plan to achieve nationwide interoperability that includes a shared or priority system for both day-to-day and emergency operations, including federal users' access to the interoperability spectrum;
- (2) recommend interoperability digital modulation, trunking, and receiver standards;
- (3) offer voluntary assistance in the development of coordinated regional plans;
- and (4) provide recommendations on other technical matters that are common to the public safety community.

The FCC has provided rulemaking concerning some NCC recommendations and is evaluating others.

Balanced Budget Act of 1997 allocated

24 MHz of spectrum to Public

Safety, and requires TV broadcasters to

transition by December 31, 2006

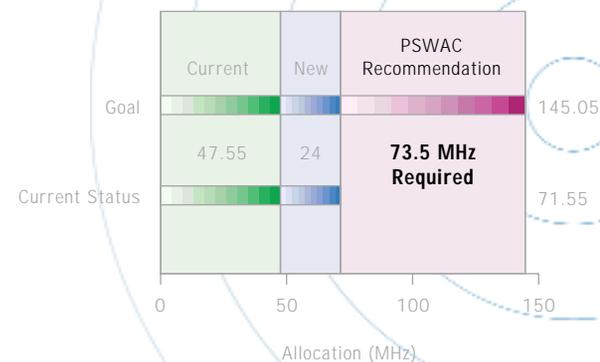
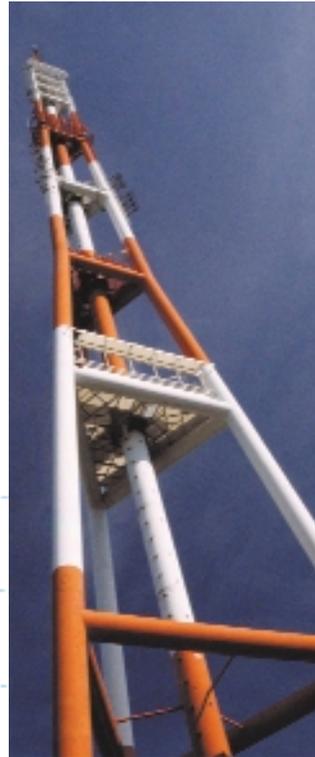
The NCC submitted its first report on February 25, 2000, that provides recommendations for technical and operational standards

Additional developments have taken place beyond the allocation of the new spectrum. For example, to promote more efficient use of the public safety spectrum, the FCC developed rules that permit the operation of trunked radio systems below 512 MHz. The implementation of trunked systems can reduce the frequency crowding in large metropolitan areas. The National Telecommunications and Information Administration (NTIA) has authorized the use of 20 frequencies between 162-174 MHz and 20 additional frequencies in the 406.1-420 MHz band to provide interoperability for joint local, state, and federal law enforcement operations and for public safety communications during disasters and emergencies. The FCC has designated channels in existing public safety bands for mutual aid purposes (five frequencies in the 150-162 MHz band and four channel pairs in the 450-512 MHz band).

Furthermore, the FCC is proposing measures that will streamline equipment authorization procedures that will promote the implementation of Software Defined Radio (SDR) technology. Federal government agencies are also exploring the use of SDR technology to provide interoperability because SDR radios can be tuned to operate in many frequency bands. Although this technology has the potential to resolve many interoperability problems, it is likely to not be available for public safety use for many years.

What Remains to Be Done?

The reallocation of 24 MHz does not meet all existing and future telecommunications needs of the public safety community. In its 1996 report, the Public Safety Wireless Advisory Committee (PSWAC) indicated that 25 MHz of spectrum was needed in 5 years and an additional 72.5 MHz will be required by 2010. Additional public safety spectrum is still needed for interoperability (frequencies below 512 MHz), voice communications, and wideband data and video applications. The public safety community should continually remind their lawmakers and the FCC that an additional 73.5 MHz is still required. Spectrum above 3 Gigahertz is especially needed to meet public safety wideband data and video applications. This spectrum will allow the public safety community to use technologies (from the commercial sector) that require wider bandwidths.



The FCC gave Regional Planning Committees (RPC) the responsibility for developing plans for use of the spectrum; however, no plans have been approved. A stringent schedule is needed for the development and approval of the regional plans. The membership of the RPCs should be adjusted to include not only federal public safety agencies but also small local public safety agencies. The membership should also be augmented to include representatives of historically under-represented public safety disciplines, such as fire departments and emergency medical personnel. To consider the requirements of the diverse array of public safety agencies, some source of funding is also needed to allow all agencies to participate in the planning process.

To ensure the national interoperability plan being developed by the NCC is effective, State Interoperability Executive Committees (SIEC), or their alternatives, should be formed to develop and administer state interoperability plans in each state and territory. The SIECs will help public safety agencies overcome increased threats and changing mission requirements by providing a central forum to share successful interoperability solutions and provide rules and guidelines for management and use of the interoperability spectrum.

Public safety agencies in many metropolitan areas along the Canadian and Mexican borders require the use of the new spectrum today to meet their daily requirements. The existing frequency coordination agreements with Canada and Mexico must be modified to ensure the new spectrum can be made available to meet these needs.

Public safety agencies have experienced radio frequency interference from commercial wireless devices in the 800 MHz frequency band. These



problems will be proliferated as more agencies migrate to the 800 MHz band and similar types of interference could occur in the new 700 MHz spectrum. Action must be taken immediately to identify and resolve the problems.

Although VHF and UHF frequencies have been authorized for public safety interoperability, they can only be used on narrowband equipment and are not available in most areas of the country. The implementation of new narrowband systems should be tracked to determine when and where the interoperable frequencies can be used.

Current spectrum management rules and regulations are not designed to encourage the implementation of shared local, state, and federal communications systems. To effectively use existing spectrum and funding resources, extensive coordination needs to occur between the FCC and NTIA to ensure that spectrum management rules allow for the establishment of shared systems and for creating an efficient environment for systems developers to obtain and maintain interoperability frequencies.

Finally, the FCC needs to continue their aggressive actions in promoting the voluntary clearing of the 700 MHz band to accelerate the transition to DTV. Equipment manufacturers should then ensure that equipment is readily available for public safety use.

Why Does It Matter?

Public safety agencies cannot effectively protect life and property without wireless communications. Natural disasters, such as wildfires, floods, and hurricanes, occur on a continuing basis. Major crises such as the bombings of the World Trade Center and the Murrah Federal Building have demonstrated the need for effective radio communications. The Nation's leaders need to make concerted efforts to provide public safety agencies the spectrum they require to complete their missions—the protection of life and property.

spectrum

MANAGEMENT

rules need to evolve with

TECHNOLOGY

For Additional Information*

Federal Communications Commission, Wireless Telecommunications Bureau, Public Safety and Private Wireless Division

For information on spectrum-related issues, hot topics, regulatory actions and decisions, Public Safety Wireless Advisory Committee reports, Public Safety National Coordination Committee reports, regional plan action, radio services and licensing, frequency coordination, spectrum refarming, FCC rules, call 202.418.0680 or visit <http://www.fcc.gov/wtb/publicsafety>

National Telecommunications and Information Administration, U.S. Department of Commerce

For information on public safety-related spectrum and telecommunications programs within the Federal Government, and Public Safety Wireless Advisory Committee reports, call 202.482.1726 or visit <http://ntiacsd.ntia.doc.gov/pubsafe>

National Institute of Justice, National Law Enforcement and Corrections Technology Center, U.S. Department of Justice

For studies, reports, or a video ("Why Can't We Talk?" When Lives Are At Stake. NCJ-172213) related to public safety radio spectrum and interoperability issues, call 800.248.2742 or visit <http://www.nletc.org>

Public Safety Wireless Network (PSWN) Program

For information regarding interoperability and public safety communications, call 800-565-PSWN or visit <http://www.pswn.gov>

**This document is an update of the Public Safety and Radio Spectrum Guide that was previously prepared by the PSWN Program. The original Spectrum Guide is out of print but can be viewed on the PSWN Program Web site.*